

Application No. 10/782,547
Paper Dated: May 8, 2008
In Reply to USPTO Correspondence of: January 15, 2008
Attorney Docket No. 4262-031383

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 10/782,547 Confirmation No. 3252
Applicant : LARRY F. RHODES
Filed : February 19, 2004
Title : VINYL ADDITION POLYCYCLIC OLEFIN
POLYMERS PREPARED USING NON-OLEFINIC
CHAIN TRANSFER AGENTS
Group Art Unit : 1796
Examiner : Robert D. Harlan
Customer No. : 28289

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 C.F.R. §1.132

Sir:

I, Larry F. Rhodes, hereby declare and state as follows:

1. I graduated from University of North Carolina in 1980 with a B.S. in chemistry and from Indiana University in 1984 with a Ph.D. in chemistry. From 1984-1986, I was a post-doctoral student at the Laboratorium für Anorganische Chemie, Swiss Federal Institute of Technology (ETH-Zentrum) in Zurich, Switzerland. From 1986-1988, I was a post-doctoral student in the Chemistry Department at The Ohio State University in Columbus, Ohio.

2. I have over 20 years of professional experience, with almost all of the experience involving some aspect of forming catalyst complexes and polymerizations that use such catalysts. I am currently a research fellow for Promerus LLC of Brecksville, Ohio,

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which is a successor of B.F. Goodrich's Electronic Materials Department, beginning my employment with B. F. Goodrich in 1988.

3. Throughout my career I have been, and remain, very active with various professional organizations involving my principle focus of catalysts and polymerizations as well as one area where Promerus polymers are used, Semiconductor Photolithography, including:

American Chemical Society, 1981-present.

Chairman, American Chemical Society, Southern Indiana Section, 1983.

International Society for Optical Engineering (SPIE), 2000-present.

Peer Reviewer for Chemical Communications, Macromolecules, Organometallics, Coordination Chemistry Reviews, Journal of Applied Polymer Science, J. Catalysis, Journal of Microlithography, Microfabrication and Microsystems, European Journal of Inorganic Chemistry, and Macromolecular Chemistry and Physics.

Peer Reviewer for NSF grant proposals.

4. I am the author/co-author of over eighty (80) technical articles and the inventor/co-inventor of over forty (40) United States patents/patent applications, the large majority of which being directed to the polymerization of norbornene-type monomers and the use of such polymers.

5. I have read and am thoroughly familiar with the contents of the above-identified application, as well as the prior art cited by the Examiner and the Board of Appeals, namely, U.S. Patent No. 6,372,869 to Arthur et al. (hereinafter referred to as "Arthur")

6. The present invention is directed to methods of polymerizing poly(cyclic)olefin monomers using polymerization catalysts containing Ni and/or Pd ligated by a monodentate ligand and non-olefinic chain transfer agents; and to unsaturated monomers having a defined formula. The resulting polymers have been found to be useful in photoresist compositions.

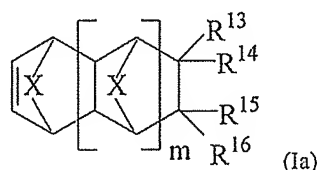
7. The present invention, as embodied by claim 1, is directed to a method of polymerizing poly(cyclic)olefin monomers comprising:

(a) combining a monomer composition comprising one or more poly(cyclic)olefin monomers, a non-olefinic chain transfer agent and an optional activator compound in a reaction vessel to form a mixture; and

(b) adding a polymerization catalyst containing Ni and/or Pd ligated by a monodentate ligand, the catalyst causing the mixture to polymerize;

wherein the non-olefinic chain transfer agent includes one or more compounds selected from the group consisting of H₂, alkylsilanes, alkylalkoxysilanes, alkylgermanes, alkylalkoxygermanes, alkylstannanes and alkylalkoxystannanes.

8. The present invention, as embodied by claim 37 is directed to an unsaturated monomer comprising Formula (Ia):

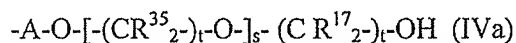


wherein X is selected from -CH₂-, -CH₂-CH₂-, O, S and -NH-; m is an integer from 0 to 5; and each occurrence of R¹³, R¹⁴, R¹⁵ and R¹⁶ are independently selected from one of the following groups:

(a) H, C₁ to C₂₅ linear, branched and cyclic alkyl, aryl, aralkyl, alkaryl, alkenyl and alkynyl;

(b) C₁ to C₂₅ linear, branched and cyclic alkyl, aryl, aralkyl, alkaryl, alkenyl and alkynyl containing one or more hetero atoms selected from O, N, and Si;

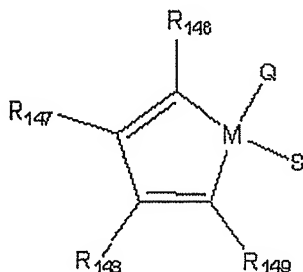
(c) a hydroxy alkyl ether according to Formula (IVa):



wherein A is a linking group selected from C₁ to C₆ linear, branched, and cyclic alkylene, each occurrence of R¹⁷ is independently selected from H, methyl and ethyl, R³⁵ is independently selected from H, methyl, ethyl, and a halide, t is from 1 to 5, and s is from 0 to 3; and

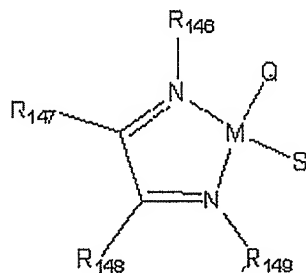
wherein at least one of R¹³, R¹⁴, R¹⁵ or R¹⁶ comprise the hydroxyalkyl ether of Formula (IV).

10. In the decision of the Board of Patent Appeals and Interferences, Arthur is relied upon as anticipating the claims of the instant application by the two concurring judges. My understanding of these judges' reasoning seems to rely on compounds (XXXXI) of Arthur, having the formula:



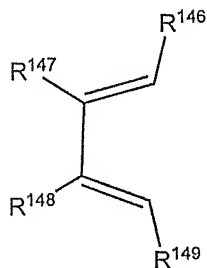
and their belief that these compounds contain monodentate ligands Q and S. Specifically, the decision states that specific embodiments of such ligands are $Q=S=Br$ and $Q=S=2\text{-ethylhexanoate}$. In these examples, M is nickel and the chain transfer agent is H_2 .

11. HOWEVER, the relied upon structure presented in Arthur (and above) is INCORRECT and thus CANNOT be relied upon as a basis of a rejection of the claims of the instant application. Specifically, immediately below where such structure is provided in column 11 of Arthur is the structure's description at lines 17-21. Such description states that " R^{146} and R^{149} are each independently hydrocarbyl or substituted hydrocarbyl, provided that the carbon atom bound to the **imino nitrogen atom** has at least two carbon atoms bound to it" (emphasis added). Therefore, the correct structure of compounds XXXXI must have 2 **imino nitrogen atoms** and is CORRECTLY represented as:



Further, as exemplified in Example 1 and others, this correct structure of compounds XXXXI is the result of the interaction of an appropriate bidentate ligand IV (see Arthur, top of column 2) and an appropriate $M(Q)(S)$.

In no case does Arthur, (see, formulae IV through XXXVI at columns 2 through 5), suggest that the structure:



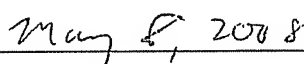
could be a ligand of any kind, yet alone a bidentate ligand, or participate in the interaction necessary to form the INCORRECT structure relied upon by the concurring judges.

12. Still further, in EVERY example provided in Arthur (see, column 12, line 42 through column 17, line 21), a Ni-complex consistent with what is represented above as the CORRECT structure XXXXI is taught. Thus again going to show that structure XXXXI as shown in column 11 of Arthur is incorrect and the concurring judges rejection of the claims of the instant application is also incorrect.

14. I declare further that all statements made herein of my own knowledge are true and that all statements made on the information and belief are believed to be true, and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable with fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful, false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,





Date